

DOCUMENT RESUME

ED 104 128

FL 006 373

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TITLE One Child's Acquisition of English Liquids. Papers and Reports on Child Language Development, No. 3.
INSTITUTION Stanford Univ., Calif. Committee on Linguistics.
PUB DATE Dec 71
NOTE 10p.
EDRS PRICE MF-\$0.76 HC-\$1.58 PLUS POSTAGE
DESCRIPTORS *Child Language; English; *Language Development; *Linguistic Theory; *Phonological Units; Phonology; Psycholinguistics; Speech

ABSTRACT

This paper concerns the acquisition of the English liquids l and r by one boy, Daniel, between August 1968 and March 1970, from the age of 1 year 6 months to 3 years 1 month. This study follows the model proposed in Stampe's "The Acquisition of Phonetic Representation," in which the child's pronunciation is derived from his mental representation of adult speech. This is done through the operation of an innate system of phonological processes. The child's successively closer approximations of adult pronunciation are interpreted as reflecting his limitations or suppressions of those processes which are not common to the adult system. The present paper outlines the main processes relevant to the acquisition of English liquids, and data are summarized to show how one particular child suppressed some of these innate processes in such a way as to arrive at a nearer approximation of the liquids used by adults in speaking English. (Author/PMP)

ED104128

ONE CHILD'S ACQUISITION OF ENGLISH LIQUIDS¹

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*Papers and Reports on Child Language
Development, No. 3
Dec. 1971*

INTRODUCTION

This paper concerns the acquisition of the English liquids l and r by one boy, Daniel, between August 1968 and March 1970, from the age of 1;6 to 3;1. This study is different from most concerning acquisition in that it does not consist of the traditional atomistic listing of substitutions, nor does it consist of a statement of the child's successive "phoneme inventories", as do those inspired by Jakobson. Rather, it follows the model proposed in Stampe's paper "The acquisition of Phonetic Representation" in which the child's pronunciation is derived from his mental representation of adult speech.² This is done through the operation of an innate system of phonological processes. The child's successively closer approximations of adult pronunciation are interpreted as reflecting his limitations or suppressions of those processes which are not common to the adult system. In the present paper I shall first outline the main processes relevant to the acquisition of English liquids, and then discuss the data and show how one particular child suppressed some of these innate processes in such a way as to arrive at a nearer approximation of the liquids used by adults in speaking English.

PHONOLOGICAL PROCESSES

The principle processes peculiar to the child in this case involve a simple delateralization of l, and what I shall refer to as a deretroflexion, or loss of r-ness. These processes result in a vocalic substitute. The syllabicity and vocalic quality of this substitute depend on the syllabicity and vocalic quality of the underlying liquid. Since nonvelar l has basically an i-quality, its delateralized substitute would be palatal, eventually y; but in certain contexts l is labiovelarized, and its substitute is labiovelar, or an u-quality vowel. The labiovelarization process does occur in some adult dialects, with varying degrees of generality. In Daniel's parents' dialect it applies to l only in syllable offsets. However, we do not necessarily expect the child's speech to reflect as limited a context for the process as does his adult model. Rather, we expect it to be more general at first, and indeed, Daniel's treatment of l indicates that labio-velarization applies in all postsegmental contexts; and Daniel's older sister Eve had shown the extreme generalization of this process to all contexts.

11. Labiovelarization:

$$l \rightarrow \left[\begin{array}{c} +Rnd \\ +velar \end{array} \right] / [] \_$$

Since r has a a-like quality, loss of its r-ness leaves a velar glide (R2b below). However, as in adult idioms, r is labialized or rounded in certain contexts, as indicated in process R1.

R1. Labialization:

$$\begin{array}{l} \text{a.} \\ \text{b.} \quad \begin{array}{c} \text{r} \\ \text{+syll} \end{array} \rightarrow [+Rnd] / \left\{ \begin{array}{c} \text{+Co\_} \\ \text{+stress} \\ \text{V\_ V} \end{array} \right\} \\ \text{c.} \end{array}$$

This says that Daniel labializes r's in three environments: (a) after zero or more syllable initial consonants, (b) when stressed, (c) intervocalically. Upon deretroflexion according to process R2, we get three distinct substitutes. For unstressed nonsyllabic r, we have nonsyllabic o or a, depending on whether or not there is rounding, and for stressed syllabic r, we have syllabic o, with the a-offglide which is typical for rounded syllabic r.

R2. Deretroflexion:

Son $\rightarrow$ -R

$$\begin{array}{ccc} \text{i.e. a) } \begin{array}{c} \text{r} \\ \text{w} \\ \left[\begin{array}{c} -\text{cor} \\ +\text{Rnd} \\ +\text{Bk} \\ +\text{Retr.} \\ -\text{Stress} \end{array} \right] \\ \downarrow \\ \text{o} \\ \wedge \end{array} & \text{b) } \begin{array}{c} \text{r} \\ \left[\begin{array}{c} -\text{cor} \\ -\text{Rnd} \\ +\text{Bk} \\ +\text{Retr.} \\ -\text{Stress} \end{array} \right] \\ \downarrow \\ \text{a} \end{array} & \text{c) } \begin{array}{c} \text{r} \\ \text{w} \\ \left[\begin{array}{c} -\text{cor} \\ +\text{Rnd} \\ +\text{Bk} \\ +\text{Retr.} \\ +\text{Stress} \end{array} \right] \\ \downarrow \\ \text{oa} \\ \wedge \end{array} \end{array}$$

Process L1, labiovelarization, excludes only initial l's. This is as it should be for Daniel since the only substitute ever found for initial l is y. Process L2 says that all l's, especially (!) labiovelarized l's, become minus coronal (become apical).

L2. Loss of Coronality:

$$\begin{array}{l} \left[\begin{array}{c} \text{lateral} \\ +\text{velar} \\ +\text{Rnd} \end{array} \right] \rightarrow -\text{Cor} \\ \text{i.e. a) } \begin{array}{c} \text{l}^w \\ \left[\begin{array}{c} +\text{velar} \\ +\text{Rnd} \end{array} \right] - \text{u}^l \\ \text{b) } \begin{array}{c} \text{l} \\ \left[\begin{array}{c} -\text{velar} \\ -\text{Rnd} \end{array} \right] - \text{i}^l \end{array} \end{array}$$

L3 is the important process of delateralization, by which [-coronal] sonorants, especially [+round], [+velar], become [-lateral].

L3. Delateralization:

$$\begin{bmatrix} \text{-Cor} \\ \text{Son} \\ [+velar] \\ [+Rnd] \end{bmatrix} \rightarrow \text{-Lateral}$$

i.e. a) $\begin{bmatrix} \text{Son} \\ [+velar] \end{bmatrix} \rightarrow \text{-Lat.}$ b) $\begin{bmatrix} \text{Son} \\ \text{-velar} \end{bmatrix} \rightarrow \text{-Lat.}$

$\underset{\sim}{u}^1 \rightarrow \underset{\sim}{u}$ $\underset{\sim}{i}^1 \rightarrow \underset{\sim}{i}$

In addition to these processes which apply specifically to the liquids, four more general processes are needed.

Process A raises the $[\underset{\sim}{o}]$ and $[\underset{\sim}{o}\underset{\sim}{\alpha}]$ resulting from R2 to $[\underset{\sim}{u}]$ and $[\underset{\sim}{u}\underset{\sim}{\alpha}]$ respectively. (There seems to be no good way of predicting exactly where this will happen, but it does take place in most words). This is similar to a process that Labov finds taking place in some New York City dialects.

A. Raising:

$$\begin{bmatrix} +voc \\ +Rnd \end{bmatrix} \rightarrow [+High] \quad \text{i.e.} \quad \begin{matrix} \underset{\sim}{o} & - & \underset{\sim}{u} & \text{a)} \\ \underset{\sim}{o}\underset{\sim}{\alpha} & - & \underset{\sim}{u}\underset{\sim}{\alpha} & \text{b)} \end{matrix}$$

Process B, Glide Loss, says that the round glide $[\underset{\sim}{\lambda}]$ is lost (a) between a vowel and a consonant, and (b) between a syllable initial consonant and a vowel. This process handles the glides resulting from both $\underset{\sim}{l}$'s and $\underset{\sim}{r}$'s.

B. Glide Loss:

$$\begin{bmatrix} +Rnd \\ \text{glide} \end{bmatrix} \rightarrow \emptyset \quad / \quad \left\{ \begin{matrix} \text{V} \text{---} \text{C} \\ \text{.C} \text{---} \text{V} \end{matrix} \right\} \quad \begin{matrix} \text{a)} \\ \text{b)} \end{matrix}$$

Process C, Strengthening, says simply that the glids $\underset{\sim}{i}$ and $\underset{\sim}{u}$ become $\underset{\sim}{y}$ and $\underset{\sim}{w}$ respectively, between an optional syllable initial consonant and a vowel, or intervocalically.

C. Strengthening:

$$\text{glide} \rightarrow [-voc] / \left\{ \begin{matrix} \text{(C)} \\ \text{V} \end{matrix} \right\} \text{---V} \quad \begin{matrix} \text{a)} \\ \text{b)} \end{matrix}$$

i.e. $\underset{\sim}{i} - \underset{\sim}{v}$
 $\underset{\sim}{u} - \underset{\sim}{w}$

Process D is absorption of a nonsyllabic η by a preceding back vowel.

D. α -Absorption:

$$\partial \rightarrow \emptyset \quad / \quad \begin{bmatrix} +\text{VOC} \\ +\text{Bk} \end{bmatrix} \quad -$$

The processes as just given are in their strongest form. They are limited and suppressed, and this takes place earlier in some positions than in others. The acquisition process is divided into **stages**, numbered by the year and month. At each stage only those forms which show a change are mentioned. (You will notice that often variant forms appear in the data. These result from Daniel's giving a word in two or more different forms on the same day.)

THE DATA

At the first stage, 1;6 and 1;7, all processes apply. For 1's we get forms like:

ball [báu], milk [mák], glasses [káka]
lookie [yŭki], but lion [lã]

The last two words indicate that L2b, Loss of Coronality, is already limited at this stage as follows:

$$\begin{bmatrix} -\text{velar} \\ -\text{Rnd} \end{bmatrix} \rightarrow -\text{cor} \quad / \quad - \begin{bmatrix} +\text{High} \\ \text{V} \end{bmatrix}$$

At this same stage, for r's we find forms like:

rockie [wáki], chair [thíə], car [kʰá], birdie [búɿ]
park [phákʰ], Mary [mæwi]
 grandma [gæmə], but truck [twák]

Since there is a w in truck, we have to say that from the **beginning** rule B, **Glide Loss**, **part b**, is limited so that

$$\begin{bmatrix} +\text{Rnd} \\ \text{glide} \end{bmatrix} \rightarrow \emptyset / \begin{bmatrix} -\text{cor} \\ \text{C} \end{bmatrix} -$$

At the next stage, 2;5, process B, part a, is limited, since milk has an u-glide, but wolf does not.

$$\left[\begin{array}{c} +\text{Rnd} \\ \text{glide} \end{array} \right] \rightarrow \emptyset / \left[\begin{array}{c} +\text{High} \\ +\text{Bk} \\ +\text{Rnd} \\ \text{V} \end{array} \right] \text{---}$$

This is a kind of absorption of $\underset{\wedge}{u}$ by a preceding similar vowel. Process B, part b, as limited above is optional at this stage. The forms for blue and front have $\underset{\wedge}{w}$'s, but flower, glider, and bullfrog do not. The main change with $\underset{\wedge}{l}$'s is that Delateralization, L3a, is limited in final position. Circle, turtle, people, and ball have final $[\underset{\wedge}{u}^1]$ from L2a, but seal is $[\text{s}\underset{\wedge}{i}\underset{\wedge}{u}]$ without the lateral.

2;5:

Lizzie $[\text{y}\underset{\wedge}{l}\underset{\wedge}{z}\underset{\wedge}{i}]$, lantern $[\text{l}\underset{\wedge}{a}\underset{\wedge}{e}\underset{\wedge}{n}\underset{\wedge}{t}\underset{\wedge}{a}\underset{\wedge}{n}]$

milk $[\text{m}\underset{\wedge}{e}\underset{\wedge}{l}\underset{\wedge}{k}]$, but wolf $[\text{w}\underset{\wedge}{u}\underset{\wedge}{f}]$.

flowers $[\text{f}\underset{\wedge}{a}\underset{\wedge}{u}\underset{\wedge}{a}\underset{\wedge}{z}]$

glider $[\text{g}\underset{\wedge}{a}\underset{\wedge}{i}\underset{\wedge}{d}\underset{\wedge}{e}]$, blue $[\text{b}\underset{\wedge}{w}\underset{\wedge}{u}]$; bullfrog $[\text{b}\underset{\wedge}{u}\underset{\wedge}{l}\underset{\wedge}{f}\underset{\wedge}{r}\underset{\wedge}{o}\underset{\wedge}{g}]$, front $[\text{f}\underset{\wedge}{w}\underset{\wedge}{a}\underset{\wedge}{n}\underset{\wedge}{t}]$

circle $[\text{s}\underset{\wedge}{r}\underset{\wedge}{k}\underset{\wedge}{a}\underset{\wedge}{u}^1]$, turtle $[\text{t}\underset{\wedge}{o}\underset{\wedge}{u}\underset{\wedge}{d}\underset{\wedge}{l}^1]$

people $[\text{p}\underset{\wedge}{h}\underset{\wedge}{i}\underset{\wedge}{p}\underset{\wedge}{a}\underset{\wedge}{u}^1]$, ball $[\text{b}\underset{\wedge}{o}\underset{\wedge}{u}^1]$, but seal $[\text{s}\underset{\wedge}{i}\underset{\wedge}{u}]$.

One word, circle, occurs at this stage with the correct stressed syllabic $[\underset{\wedge}{r}]$. Since the rule for deretroflexion is still needed for several other forms of the same type, I am regarding this isolated word as an exception, or precursor of what is to come.

Process D, $\underset{\wedge}{a}$ -Absorption, is limited here, since horsie and birdie appear with $\underset{\wedge}{a}$ -glides. The $\underset{\wedge}{a}$ -glide is absorbed only after low, back rounded vowels.

$$\underset{\wedge}{a} \rightarrow \emptyset / \left[\begin{array}{c} +\text{Low} \\ +\text{Bk} \\ +\text{Rnd} \\ \text{V} \end{array} \right] \text{---}$$

birdie $[\text{b}\underset{\wedge}{u}(\underset{\wedge}{a})\underset{\wedge}{d}\underset{\wedge}{i}]$, horsie $[\text{h}\underset{\wedge}{o}(\underset{\wedge}{a})\underset{\wedge}{s}\underset{\wedge}{i}]$.

At the next stage, 2;6, process L2a, Loss of Coronality, has become optional, since we find $\underset{\wedge}{l}$'s occurring in blocks, flags, and blue, but the words for airplane and play have $\underset{\wedge}{w}$'s, and clap and clown have not even a $\underset{\wedge}{y}$. The optionality of the process is shown clearly by the word plate, which occurs in all three possible forms.

$[\text{bl}^{\wedge}\underset{\wedge}{o}\underset{\wedge}{k}\underset{\wedge}{s}]$, $[\text{bl}^{\wedge}\underset{\wedge}{a}\underset{\wedge}{e}\underset{\wedge}{g}\underset{\wedge}{z}]$

$[\text{bl}^{\wedge}\underset{\wedge}{u}] \sim [\text{b}\underset{\wedge}{w}\underset{\wedge}{u}]$, but $[\text{a}\underset{\wedge}{e}\underset{\wedge}{p}\underset{\wedge}{w}\underset{\wedge}{e}\underset{\wedge}{i}\underset{\wedge}{n}]$, $[\text{p}\underset{\wedge}{h}\underset{\wedge}{w}\underset{\wedge}{e}\underset{\wedge}{i}]$, $[\text{k}^{\wedge}\underset{\wedge}{a}\underset{\wedge}{e}\underset{\wedge}{p}]$, $[\text{k}^{\wedge}\underset{\wedge}{a}\underset{\wedge}{e}\underset{\wedge}{u}\underset{\wedge}{n}]$

$[\text{p}\underset{\wedge}{h}\underset{\wedge}{e}\underset{\wedge}{i}\underset{\wedge}{t}] \sim [\text{p}\underset{\wedge}{h}\underset{\wedge}{w}\underset{\wedge}{e}\underset{\wedge}{i}\underset{\wedge}{t}] \sim [\text{p}\underset{\wedge}{h}\underset{\wedge}{l}^{\wedge}\underset{\wedge}{w}\underset{\wedge}{e}\underset{\wedge}{i}\underset{\wedge}{t}]$

Rule B, Glide Loss, part b, is optional, as it was at 2;5. This accounts for the words clown, clap and blue, etc., above, some having w's and some not. It also accounts for the following forms:

brush [bás], brown [báun]
broke [bwók], cream [kwim]

By stage 2;8, there have been a number of changes. Nearly all of the processes concerning l's have been suppressed, and most l's are "normal".

apple [hápl^w], flower [fəl^wáur], balloon [bəl^wún], etc.

More r's are appearing at 2;8. R2, Deretroflexion, a and b, seems to be limited, or better, optional, since reasonable limiting conditions are not evident. Room appears with an initial r, but red still has w.

Crayons has correct postconsonantal r. Teacher and picture have final ə. Process B, part b, is optional here, as before, but the frequency of its application is decreasing. Froggie has no w, but bricks and tree do.

2;8:

Ringo [wíŋgo], room [rúm]
crayons [k^hréinz]
together [t^hugézə], but picture [p^hítsr], teacher [t^hítsr]
froggie [fógi], bricks [bwíks], tree [twí].

The only change at 2;10 is a limitation of Deretroflexion in intervocalic position, since pirates and fairy are found with correct r's

[p^háiréts], [fáeri]

At 2;11, a few vestiges of the L processes appear. For example, seal is found as both [sí] and [síu]. R2, Deretroflexion (a and c) is optional here in several positions. In initial position we find r's in red and great, but rabbit occurs both with w and with r.

[réd], [réit], but [wáblt] ~ [ráblt]

In postconsonantal position correct r's are found in tree, three, green, and dragon, but w's are still found in try and break. (Notice also that Daniel inserts epenthetic ə's to break up clusters at this stage.)

tree, three [sərí], green [gərin], dragon [dəráegn]
 but try [səwáɪ], string [səwíŋ], break [bəwéɪk]

In intervocalic position, we have orange and Mary with w's, but very with an r.

[ɔwln̩], [máwi], but [vári]

For preconsonantal r, process R2c has finally become optional.

dirty [dúɹdi], words [wúɹdz], but turtle [túɹdl] ~ [tɹdl].

At the last stage, 3;1, there is no evidence of the processes affecting l's, and we find near adult forms like

little [lɪtɪ^w], wolf [wúl^wf], blue [bl^wú],
rolling [róul^wln̩].

However, the processes affecting r's are not yet entirely suppressed. Part a of Deretroflexion, R2, is suppressed since we find [drɪnkt], [ɔrl̩n̩], [bráun̩], [gərɪl̩ə]. As before part b of R2 is optional in final position: there [néiə], but robber [rɔb̩ə] ~ [rɔb̩ɹ]. Part c of R2 is optional, but it applies less frequently at this stage:

bird [búɹd], worm [wúɹm], but
work [wɹk], turn [tɹn], and turtle [túɹdl] ~ [tɹdl].

Forms like these last are interesting because they seem to show an on-going process of suppression.

It is clear that by 3;1 Daniel has successfully suppressed or limited several of the innate processes that we postulated for him, and he is, therefore, much closer to the adult system. The material just presented shows that this different type of analysis of the acquisition of phonology is possible, and in fact works out very well for this small (but quite typical) bit of data. We hope that more extensive work with it may further prove its value as a mechanism for explaining the process of phonological acquisition in children.

FOOTNOTES

¹ This paper was presented at the Summer Meeting of the Linguistic Society of America, 1970.

² Papers from the Fifth Regional Meeting, Chicago Linguistic Society, 1969. Pp. 433-444.